

# Guía Práctica — Ecuaciones Diferenciales por Variables Separables

**Instrucción:** Resolver mediante separación de variables; cuando haya condiciones iniciales, hallar la solución particular.

## Nivel 1 — Básico

1.  $y' = 3x^2$
2.  $y' = 2e^{3x}$
3.  $y' = xy, \quad y(0) = 2$
4.  $y' = \frac{1}{1+x^2}$
5.  $y' = \frac{1}{x}$
6.  $y' = \frac{1}{1+y^2}$
7.  $(1+y^2)y' = e^x$
8.  $y' = y \tan x, \quad y\left(\frac{\pi}{4}\right) = 1$
9.  $y' = (1-x)y^2$
10.  $(y+1)y' = xe^x$
11.  $y' = \frac{y+2}{e^x}, \quad y(0) = 0$
12.  $y' = ky$

## Nivel 2 — Intermedio

$$13. y' = \frac{\sin y}{\sin x}$$

$$14. y' = \frac{y(1+y)}{x}, \quad y(0) = 1$$

$$15. y' = (a - bx)y, \quad y(0) = y_0$$

$$16. (1 - y)y' = x + 2$$

$$17. y' = \frac{1}{1 + y^2}$$

$$18. e^x y' = \frac{y}{1 - \cos x}, \quad y(0) = 0$$

$$19. y' = \frac{1 + x^2}{y}, \quad y(0) = 1$$

$$20. y' = y(1 - y), \quad y(0) = y_0$$

$$21. 2xy(x + 1)y' = y^2 + 2$$

$$22. y' = ax + y, \quad a > 0, a \neq 1$$

$$23. y' = \frac{y - 12}{x + 12}, \quad y \neq \pm 1$$

$$24. y' = \frac{y(y - 1)}{e^x}, \quad y(0) = 2$$

## Nivel 3 — Avanzado

$$26. y' = \frac{1 - y^2}{\sin x}$$

$$27. y' = \frac{1 + x^2}{(1 + y)^2}, \quad y(0) = 0$$

$$28. y' = \frac{1 + x^2}{y \ln y}, \quad y(0) = e$$

$$29. \quad y' = \frac{y + y^2}{e^x + 1}$$

$$30. \quad y' = \frac{y(1 - y^2)}{xe^x}$$

$$31. \quad y' = \frac{1 + x^2}{(y - a)(y - b)}, \quad y(0) = y_0$$

$$32. \quad y' = \frac{y(1 - y/K)}{x}, \quad y \neq 0, K$$

$$33. \quad 3e^x \tan x \, dx + (2 - e^x) \sec^2 x \, dy = 0$$

$$34. \quad (y^2)' = 2y, \quad y(x_0, y_0) = (2, 4)$$